

Remarks

In addition to Claim 7, where the number of fibers that protrude through the outer side of the support system is limited, all other independent claims have been amended to include similar limitations. Applicants Fig. 4 relates to these limitations.

Rejection Under 35 U.S.C. 112

Claim 16 has been amended as suggested by the Examiner so that it is consistent with independent Claim 10. This should remove all 35 U.S.C. 112 objections.

Rejections Under 35 U.S.C. 103

All claims 1-23 remain pending. Claims 1, 5, 11, 16-17, 21 and 23 have been amended. All claims except Claims 4, 10, 16, and 20, which relate to phosphorous oxide coatings on the fibers, including independent claim 7 are rejected as obvious in view of Applicants' admission of prior art in view of "Permtech Beta 2HPSL with Stainless Steel Fibers" (hereinafter "Permtech Beta 2HPSL/SS") and "Refractories".

No possible combination of these references would make obvious the limitation ". . . where now more than 20 fibers per sq. cm. on average protrude through the outer side of the support . . ." ^{is} present in all independent claims.

Applicant's specification states:

"Fig. 2 shows the refractory support 12 of this invention having external, exposed exterior side 24 and interior side 26, with long, thin, metal fibers 40 contained within the refractory support 12. . . . Some fibers have cross over points 42 but, preferably, have a substantially random dispersal arrangement as at points 44, 46, 50 and 52. . . . Some fibers 40 pass through the exterior side wall 24 as at points 46 and are subject to chemical corrosive attack by a variety of gases from the bath and anode which can start degradation at point 46 and continue through the refractory matrix 48 to various cross over points 50 and continue corrosive effects to, for example, point 52 deep in the refractory matrix. On the very rare occasion that thermal shock might start a crack 56, and cause the crack to propagate as shown at 58,

use of fibers 60 will help stop the effect and maintain the integrity of the support, as shown at the top of Fig. 2." (emphasis added)

"Fig. 4 shows a 1 sq. cm. idealized, magnified view of the exposed side 24 of the castable refractory support 12, showing fiber protrusion at for example point 46. As shown in Fig. 4, seven fibers are shown protruding through the exposed side for possible contact with harmful gases in an aluminum smelting environment. Up to 20 fiber protrusions per sq. cm., on average are acceptable. . . . Preferably there are only up to 10 fiber protrusions per sq. cm., on average. . ." (emphasis added)

In Example 1, 5 to 10 fibers per sq. cm were found to protrude [0040] with excellent results. Applicants have determined the effective amount of metal fibers to use within the refractory coupled with the maximum allowable fiber protrusions to provide superior results in terms of a combination of resistance to chemical corrosive attack and thermal shock, specific to the use in a molten salt bath of an electrolysis apparatus. These limitations are important, and as the court stated in In re Boe and Duke, 184 U.S.P.Q. 38,40 (1974 C.C.P.A.):

"This court has stated that all limitations must be considered and that it is error to ignore specific limitations distinguishing over the references. In re Saether, 181 U.S.P.Q. 36,39 (1974 C.C.P.A.); In re Glass, 176 U.S.P.Q. 489,491 (1973 C.C.P.A.)."

Also, case law dictates that in proceeding from the prior art to the invention claims, one cannot base obviousness of what a person skilled in the art would have led a person to do, as stated in In re Tomlinson, Hall and Geigle, 150 U.S.P.Q. 623,626 (C.C.P.A 1966):

"Our reply to this view is simply that it begs the question; which is obviousness under section 103 of compositions and methods, not of the direction to be taken in making efforts or attempts. Slight reflection suggests, we think that there is usually an element of 'obviousness to try' in any research endeavor, that it is not undertaken with complete blindness but rather with some semblance of a change of success, and that patentability determinations based on that as a test would not only be marked deterioration of the entire patent systems as an incentive to invest in those efforts and attempts which go by the name of 'research'."

And also affirmed in *The Gillette Co. v. S.C. Johnson and Son, Inc.*, 16 USPQ 2d 1923, 1928 (Fed.Cir. 1990). Also, as stated by the court in *In re Regal*, 18 U.S.P.Q. 136, 139 (C.C.P.A. 1975):

"As we have stated in the past, there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references. In *re Stemniski*, 170 USPQ 343 (CCPA 1971). Further, as we stated in *In re Bergel*, 130 USPQ 206 (CCPA 1961); 'The mere fact that it is possible to find two isolated disclosures which might be considered in such a way to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest desirability of the proposed combination'."

And also affirmed in *In re Gergen*, 1 USPQ 2d 1652, 1653 (Fed. Cir. 1989), and *Symbol Technologies Inc. v. Opticon Inc.*, 19 USPQ 2d 1241, 1246 (Fed. Cir. 1991).

Applicants see no discussion in either *Permatech Beta 2 HPSL/SS* nor *Refractories* that would teach or specifically suggest the limitation to about <20 fiber protrusions per sq. cm. on average, originally in Claim 7 and by amendment in all the claims except amended claims 5, 11, and 21, which require less protrusions. As previously discussed the specification points out the importance of these limits. Applicants respectfully submit that neither admitted prior art, *Permatech Beta 2HPSL/SS* nor *Refractories*, taken either alone or in combination, teach or make obvious to one skilled in the art at the time the invention was made, the invention of amended claims 1-3, 5-9, 11-15, 17-19 and 21-23.

Claims 4, 10, 16 and 20 are subject to the same rejection but further in view of *Cheyrezy et al. '867*, which relates to concrete. While *Cheyrezy et al.* describes many ways to increase fiber roughness, and controlling fiber/matrix bonding by etching, silica deposition and/or metal phosphate deposition, it adds nothing to the teachings that *Permatech Beta 2HPSL/ss* and *Refractories* lack to make the independent claims 1, 7, 17 and 23 obvious. Applicants respectfully submit that neither admitted prior art, *Permatech Beta 2HPSL/ss*, *Refractories* nor *Cheyrezy et al. '867* or in combination, teach or make obvious to one skilled in the art at the time the invention was made, the invention of amended claims 1-23. While applicants have emphasized certain limitations, those limits in combination with others in the amended claims add a combined effect to provide a unique support for use in molten salt bath/electrolysis systems.

Summary

All outstanding issues are believed to have been addressed. In view of the foregoing amendments and arguments, applicants respectfully submit that all pending claims, Claims 1-23 are in condition for allowance; and Applicants respectfully request reconsideration and allowance of those claims.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Daniel P. Cillo". The signature is fluid and cursive, with the first name "Daniel" being more prominent.

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